IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Richard E. Smalley et al.

For: CARBON FIBERS FORMED FROM SINGLE-WALL CARBON NANOTUBES

Atty Dkt: 11321-P012USD13

Serial No: To Be Assigned (division of application Serial No. 09/380,545)

Filed: CONCURRENTLY HEREWITH

Group Art Unit: 1754 (anticipated)

Prior Examiner: Stuart Henderson 703.308.2539

"EXPRESS MAIL" MAILING LABEL

Number. EL 823 269 075 US

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PRELIMINARY AMENDMENT ACCOMPANYING REQUEST FOR FILING DIVISIONAL APPLICATION UNDER 37 C.F.R. § 1.53(b)

Sir:

This paper accompanies a Request for Filing Divisional Application Under 37 C.F.R. § 1.53(b) and associated filing fee therefor ("the Request"). If the fee payment is missing or insufficient in amount, or if any other fees are determined to be due, the Assistant Commissioner, Commissioner, and/or the Director of the U.S. Patent & Trademark Office is/are hereby authorized to charge any such fees (or credit any overpayment) to Winstead Sechrest & Minick Deposit Account No. 23-2426, referencing matter number 11321-P012USD13.

AMENDMENTS

In the Title

Please amend the title by replacing the present title with the following:

--COMPOSITIONS AND ARTICLES OF MANUFACTURE--

In the Abstract

Please amend the abstract by replacing the present abstract with the following:

--This invention relates generally to compositions and articles of manufacturing comprising single-wall carbon nanotubes (SWNTs). Tubular single-wall carbon nanotube molecules are useful for making electrical connectors for devices such as integrated circuits or semiconductor chips used in computers because of the high electrical conductivity and small size of the carbon molecule. SWNT molecules are also useful as components of electrical devices where quantum effects dominate at room temperatures, for example, resonant tunneling diodes. The metallic carbon molecules are useful as antennas at optical frequencies, and as probes for scanning probe microscopy such as are used in scanning tunneling microscopes (STM) and atomic force microscopes (AFM). Tubular carbon molecules may also be used in RF shielding applications, e.g., to make microwave absorbing materials.--

In the Specification

Please amend the specification as noted on page 5, paragraph 11 of the Request by inserting before the first line of the specification the following:

--RELATED APPLICATIONS

This application is a division of co-pending prior U.S. patent application Serial No. 09/380,545, filed on September 3, 1999, entitled "CARBON FIBERS FORMED FROM SINGLE-WALL CARBON NANOTUBES," which is the 35 U.S.C. § 371 national application of International Application Number PCT/US98/04513 filed on March 6, 1998, which

designated the United States, claiming priority to: provisional U.S. patent application Serial Number 60/067,325, filed on December 5, 1997; provisional U.S. patent application Serial Number 60/064,531, filed on November 5, 1997; provisional U.S. patent application Serial Number 60/063,675, filed on October 29, 1997; provisional U.S. patent application Serial Number 60/055,037, filed on August 8, 1997; provisional U.S. patent application Serial Number 60/047,854, filed on May 29, 1997; and provisional U.S. patent application Serial Number 60/040,152, filed on March 7, 1997. Each of the foregoing applications is commonly assigned to the assignee of the present invention and is hereby incorporated herein by reference in its entirety.

This application discloses subject matter related to the subject matter of U.S. patent application Serial Number 10/000,746, filed on November 30, 2001 in the name of Daniel T. Colbert et al., entitled "MACROSCOPICALLY MANIPULABLE NANOSCALE DEVICES MADE FROM NANOTUBE ASSEMBLIES," which application is commonly assigned to the assignee of the present invention.--

In the Claims

Please amend the claims as follows:

A. Please cancel claims 1-162 without prejudice or disclaimer to the subject matter thereof.

B. Please add the following new claims 163-195:

163. (New) A molecular wire comprising a cut single-wall carbon nanotube.

164. (New) A quantum device comprising a conductor, wherein the conductor comprises a cut single-wall carbon nanotube.

165. (New) An electrical connector comprising a plurality of purified single-wall carbon nanotubes of predominantly (n,n) configuration.

166. (New) An integrated circuit comprising a plurality of molecular wires, wherein the molecular wires comprise cut single-wall carbon nanotubes.

167. (New) An electrical device comprising a plurality of purified single-wall carbon nanotubes of predominantly (n,n) configuration.

168. (New) The electrical device of claim 167 wherein the electrical device comprises a resonant tunneling diode.

169. (New) A transistor element comprising a plurality of purified carbon nanotubes of predominantly (m,n) configuration, wherein m is not equal to n.

170. (New) An RF shielding device comprising a plurality of single-wall carbon nanotubes, wherein the single-wall carbon nanotubes have been purified and cut, and wherein the purified and cut single-wall carbon nanotube have a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities, end derivatization and combinations thereof.

171. (New) A microwave absorbing material comprising a plurality of single-wall carbon nanotubes, wherein the single-wall carbon nanotubes have been purified and cut, and wherein the purified and cut single-wall carbon nanotube have a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities, end derivatization and combinations thereof.

172. (New) A hydrogen storage device comprising a plurality of single-wall carbon nanotubes, wherein the single-wall carbon nanotubes have been purified and cut, and wherein the purified and cut single-wall carbon nanotube have a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities, end derivatization and combinations thereof.

173. (New) A battery comprising a plurality of single-wall carbon nanotubes, wherein the single-wall carbon nanotubes have been purified and cut, and wherein the purified and cut single-wall carbon nanotube have a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities, end derivatization and combinations thereof.

174. (New) A fuel cell comprising a plurality of single-wall carbon nanotubes, wherein the single-wall carbon nanotubes have been purified and cut, and wherein the purified and cut single-wall carbon nanotube have a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities, end derivatization and combinations thereof.

175. (New) An antenna comprising single-wall carbon nanotubes.

176. (New) The antenna of claim 175 further comprising a mounting element attached to at least one of the single-wall carbon nanotubes.

177. (New) An antenna of claim 176 wherein the single-wall carbon nanotubes are predominantly (n,n) configuration.

178. (New) A light harvesting antenna comprising an (n,n) single-wall carbon nanotube and a means for rectification.

179. (New) The light harvesting antenna of claim 178 wherein the rectification means is a Schottky barrier.

180. (New) The list harvesting antenna of claim 179 wherein the Schottky barrier further comprises a nanotube/metal contact.

181. (New) An array of antennae comprising single-wall carbon nanotubes.

182. (New) An array of light-harvesting antennae wherein at least some of the antennae comprise a means for rectification.

183. (New) An array comprising a plurality of antennae, wherein each of the antennae comprise single-wall carbon nanotubes having a characteristic operable for electric currents within at least two of the antennae to interact coherently with an electromagnetic field.

184. (New) The array of claim 183 wherein the characteristic is selected from the group consisting of lengths, locations, orientations and combinations thereof.

185. (New) The array of claim 181 wherein currents induced by interaction with an electromagnetic field produce a secondary electromagnetic field that is radiated from the array.

186. (New) The array of claim 181 wherein the array is formed by self-assembly.

187. (New) An electrical circuit comprising a plurality of funtional elements, wherein the functional elements comprise fullerene molecules capable of transferring electrical charge between the functional elements of the electrical circuit.

188. (New) An electrical circuit of claim 187 wherein the fullerene molecules are operable as an electrical contact in a switch.

189. (New) An electrical circuit of claim 187 wherein the electrical circuit comprises a bridge rectifier.

190. (New) An electrical circuit of claim 187 wherein the electrical circuit comprises a diode.

191. An electrical circuit of claim 187 wherein the fullerene molecules are self-assembled.

192. (New) An electrochemical probe comprising a conducting single-wall carbon nanotube molecule.

193. (New) A nano-forcep comprising an assembly of single-wall carbon nanotube molecules.

194. (New) An assembly of single-wall carbon nanotube molecules operable as a connecting element in a micro electro mechanical system.

195. (New) An assembly of single-wall carbon nanotube molecules operable as a circuit element in a micro electro mechanical system.

REMARKS

A. *Status of the Application.* Claims 1-162 are cancelled herein without prejudice or disclaimer to the subject matter thereof. Additionally, claims 163-195 have also been added herein. No new matter is added by the addition of these claims.

CONCLUSION

It is believed that each of the claims now pending in the present application recites elements neither taught nor suggested by the prior art. Further, it is believed that the application as a whole is in proper form and condition for allowance. If the Examiner believes that the application may be placed in even better condition for allowance, he or she is invited to contact the undersigned at the telephone number noted below. Alternatively, or in addition, if the Examiner believes that an Examiner interview would be beneficial, the Examiner is invited to note that the undersigned has ready access to the videoconferencing facilities of the South Central Intellectual Property Partnership at Rice University in Houston, Texas. The inventors and the undersigned would welcome the opportunity to use those facilities to clarify any issues deemed to remain unresolved.

Respectfully submitted,

Date: December 28, 2001

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